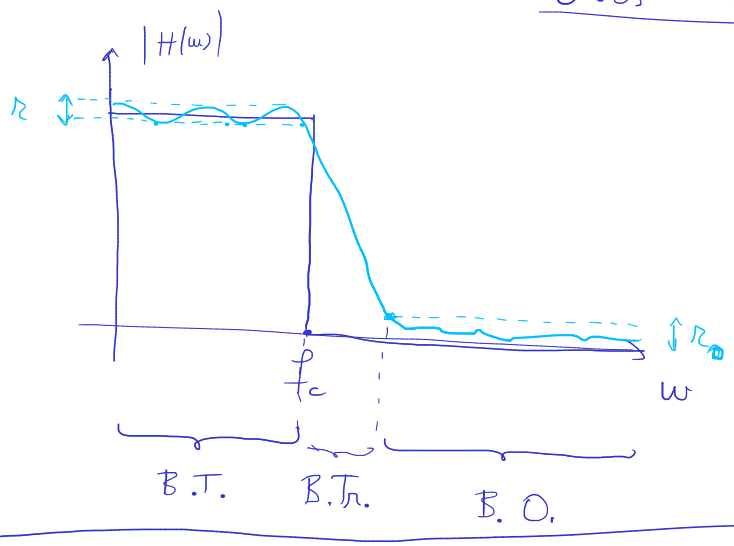
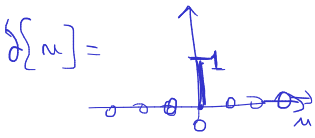
Curs 01





Exemplu Padé

$$H(z) = \frac{b_0 + b_1 z^{-1} + b_2 z^{-2}}{1 + a_1 z^{-1} + a_2 z^{-2}}$$

$$h_d[n] = \left(\frac{1}{3}\right)^n \cdot \cos\left(\frac{n\pi}{4}\right)$$

$$h_d[1] = \frac{1}{3} \cdot \cos\frac{\pi}{4} = \frac{\sqrt{2}}{6}$$

$$h_d[3] = \frac{1}{27} \cdot \cos\frac{3\pi}{4} = \frac{-\sqrt{2}}{54}$$

$$y[n] = -a_1 \cdot y[n-1] - a_2 \cdot y[n-2] + b_0 \cdot x[n] + b_1 x[n-1] + b_2 x[n-2]$$

$x[n] = \delta[n]$
$y[n] = h[n]$

$$h[n] = -a_1 h[n-1] - a_2 h[n-2] + b_0 \delta[n] + b_1 \delta[n-1] + b_2 \cdot \delta[n-2] = h_d[n]$$

pentru $n = 0, 1, 2, 3, 4$

b_m

$n=0$
$$h[0] = -a_1 \cdot \underbrace{h[-1]}_{0} - a_2 \cdot \underbrace{h[-2]}_{0} + b_0 \cdot \underbrace{\delta[0]}_{1} + b_1 \cdot \underbrace{\delta[-1]}_{0} + b_2 \underbrace{\delta[-2]}_{0} = h_d[0] = 1$$

$n=1$
$$h[1] = -a_1 \cdot \underbrace{h[0]}_{1} - a_2 \cdot \underbrace{h[-1]}_{0} + b_0 \cdot \underbrace{\delta[1]}_{0} + b_1 \cdot \underbrace{\delta[0]}_{1} + b_2 \cdot \underbrace{\delta[-1]}_{0} = h_d[1] = \frac{\sqrt{2}}{6}$$

$n=2$
$$h[2] = -a_1 \cdot \frac{\sqrt{2}}{6} - a_2 \cdot 1 + b_0 \cdot \underbrace{\delta[2]}_{0} + b_1 \cdot \underbrace{\delta[1]}_{0} + b_2 \underbrace{\delta[0]}_{1} = h_d[2] = 0$$

$n=3$
$$h[3] = -a_1 \cdot 0 - a_2 \cdot \frac{\sqrt{2}}{6} + b_0 \underbrace{\delta[3]}_{0} + b_1 \underbrace{\delta[2]}_{0} + b_2 \underbrace{\delta[1]}_{0} = h_d[3] = \frac{-\sqrt{2}}{27}$$

$n=4$
$$h[4] = +a_1 \cdot \frac{\sqrt{2}}{54} - a_2 \cdot 0 + b_0 \cdot \underbrace{\delta[4]}_{0} + b_1 \underbrace{\delta[3]}_{0} + b_2 \underbrace{\delta[2]}_{0} = h_d[4] = \frac{-1}{81}$$

$$\begin{cases} -a_1 \cdot 0 - a_2 \frac{\sqrt{2}}{6} = \frac{-\sqrt{2}}{54} \\ a_1 \cdot \frac{\sqrt{2}}{54} - a_2 \cdot 0 = \frac{-1}{81} \end{cases}$$

$$\Rightarrow a_2 = \frac{6}{\sqrt{2}} \cdot \frac{\sqrt{2}}{54} = \frac{1}{9}$$

$$\Rightarrow a_1 = \frac{54}{\sqrt{2}} \cdot \frac{-1}{81} = \frac{-\sqrt{2}}{3}$$

1): $b_0 \cdot 1 = 1 \Rightarrow b_0 = 1$

2): $-\frac{\sqrt{2}}{3} \cdot 1 + b_1 = \frac{\sqrt{2}}{6} \Rightarrow b_1 = \frac{\sqrt{2}}{6} - \frac{\sqrt{2}}{3} = \frac{-\sqrt{2}}{6}$

3): $+\frac{\sqrt{2}}{3} \cdot \frac{\sqrt{2}}{6} - \frac{1}{9} + b_2 = 0 \Rightarrow b_2 = \frac{1}{9} - \frac{2}{18} = 0$

M. cele mai mici pătrate

$$\begin{cases} k=1: & \sum_{l=1}^{N} a_l \cdot R_{dd}[1,l] = -R_{od}[1] \\ k=2: & \\ \vdots & \\ k=N: & \end{cases}$$